181. Proposed by W. J. GREENSTREET, M. A., Editor of The Mathematical Gazette, Stroud, England.

At a sea-side excursion for x men there are boats enough for q men, and carriages enough for z. But p do not care for driving, and q would feel indifferently comfortable on the water, while the rest do not care either way. Each man has what he prefers as long as a seat is left for him in carriages or boats, and those who do not care either way choose at random. Find the chance that all will be satisfied.

Solution by G. B. M. ZERR, A. M., Ph. D., Parsons, W. Va.

$x<z+q$, $p<q$. Let c=required chance. $x-p-q$ choose at random.

After the $p+q$ persons are satisfied there are still left $q-p$ boats and $z-q$ carriages or $z-p$ conveyances left for the random choosers to select from. $x-p-q$ things can be selected from x things in

$$N=\frac{x!}{(x-p-q)!\,(p+q)!} \text{ ways.}$$

$x-p-q$ things can be selected from $z-p$ things in

$$n=\frac{(z-p)!}{(x-p-q)!\ (z+q-x)!} \text{ ways.}$$

Then $c=\dfrac{n}{N}=\dfrac{(z-p)!\ (p+q)!}{x!\ (z+q-x)!}$.

182. Proposed by L. MORDELL, Philadelphia, Pa.

Out of n straight lines whose lengths are 1, 2, 3, 4, ..., n inches, respectively, the number of ways in which 4 may be chosen which will form a quadrilateral in which a circle may be inscribed is $\frac{1}{48}[2n(n-2)(2n-5)-3+3(-1)^n]$.

Solution by J. SCHEFFER, A. M., Hagerstown, Md.

Taking the first four numbers we get one possible case; taking five, 3; taking six, 7 cases; etc. Thus we have the series 1, 3, 7, 13, 22, 34, 50, 70, 95, 125, ..., of which we have to find the general term. If n is an *even* number, we have the series 1, 7, 22, 50, 95, ..., of which we find $a_0=1$, $\triangle a_0=6$, $\triangle^2 a_0=9$, $\triangle^3 a_0=4$, $\triangle^4 a_0=\triangle^5 a_0 ...=0$. The number of terms is $\frac{1}{2}n-1$.

$\therefore y_n=\frac{1}{24}n(2n^2-9n+10)=\frac{1}{24}n(n-2)(2n-5)$.

If n is an *odd* number, we have the series 3, 13, 34, 70, 125, ..., of which $a_0=3$, $\triangle a_0=10$, $\triangle^2 a_0=11$, $\triangle^3 a_0=4$. Thus, the number of terms being $\dfrac{n-3}{2}$, we find $\frac{1}{24}n(2n^2-9n+10)-\frac{3}{24}=\frac{1}{24}n(n-2)(2n-5)-\frac{3}{24}$.

Both formulae may be condensed into $y_n=\frac{1}{48}[2n(n-2)(2n-5)-3+3(-1)^n]$.

Also solved by G. B. M. Zerr.